

## **Integration and Testing of the Superconducting Magnet and Cryogenics for AMS**

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**Abstract** - The Alpha Magnetic Spectrometer is a high-resolution cosmic-ray telescope for charged-particles and photons, to be staged on the International Space Station in 2010. A central element of the spectrometer is a 0.8 T, 1 m aperture superconducting dipole magnet. The windings employ Cu-stabilized NbTi conductor and are conduction-cooled in a super-fluid He cryostat. The cryogenics for the magnet employs a number of novel elements, indirect cooling using a serpentine heat pipe, thermomechanical pumping for re-cooling after quench and during current charging, capillary gathering of superfluid within the storage dewar, and a porous-plug phase separator. The magnet is designed to operate in persistent mode, with provisions for disconnect/reconnect of current leads. The magnet and cryogenics have been built and integrated. The AMS magnet system has been commissioned into operation and operating characteristics have been evaluated during tests at CERN. Results of the commissioning and testing are presented. Lessons for future space applications of superconducting magnets will be discussed.

**Index Terms** - superconducting, dipole, spectrometer, super-fluid, space

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